# Interchangeability, Upgrade-ability, Modularity

## Key factors for LED implementation in the commercial ambient lighting market

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# Overview

- Lack of interchangeability and upgrade-ability in the LED world is a challenge for the commercial ambient lighting market
- LED fixture manufacturers are turning toward modular, interchangeable and cross-compatible designs
- Trying to adapt existing form factors and connectivity methods is not always the best solution
- Zagha specifications are a vehicle for ensuring interchangeability and compatibility
- Cooperation and standardization among product manufacturers will become more prevalent

# A Clash Of Two Paradigms

**We are experiencing the interaction of two monolithic industries – the lighting industry and the electronics industry**

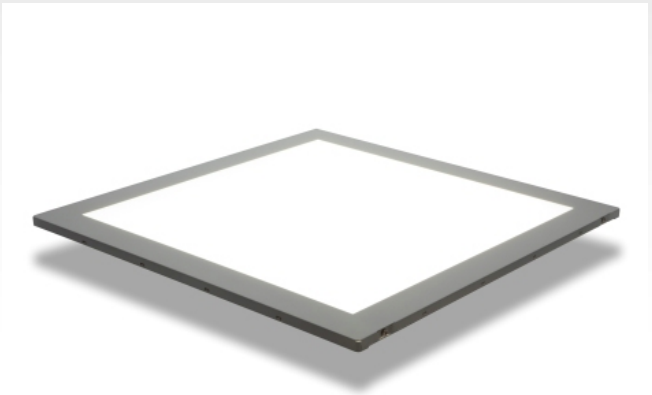
**These industries have very different modes of operation and very different sets of customer expectations**

**Both industries will change as a result**

# In A Nutshell

**The Industry That Gives Us This:**

**Now Gives Us This:**



**But We Still Think It's This:**

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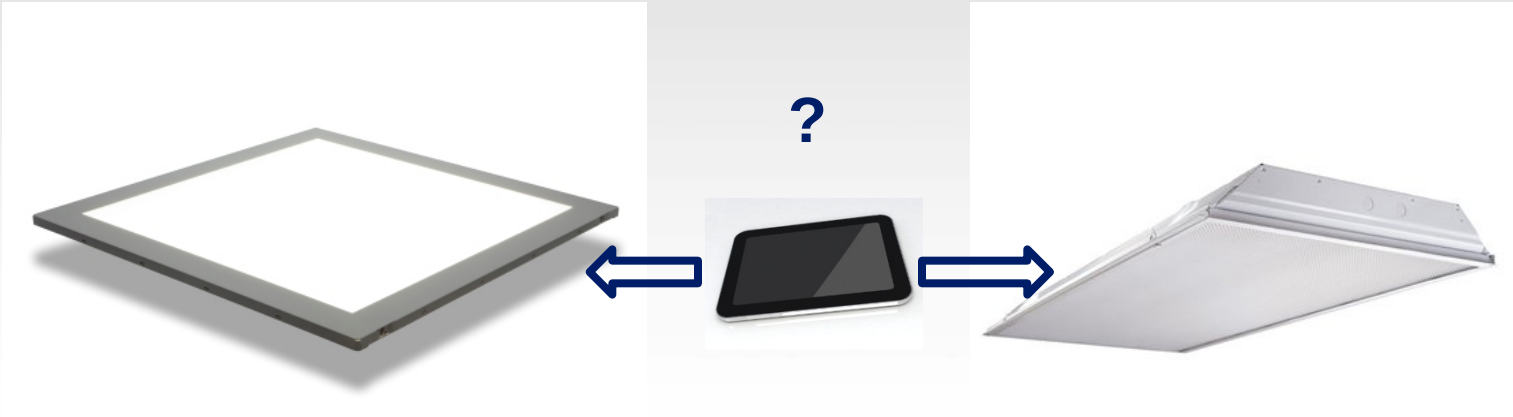
# How Is The Electronics Industry Influence Different, And How Is It Changing Us?




## 1. Non-Modular

# We Misinterpreted The Lack of Modularity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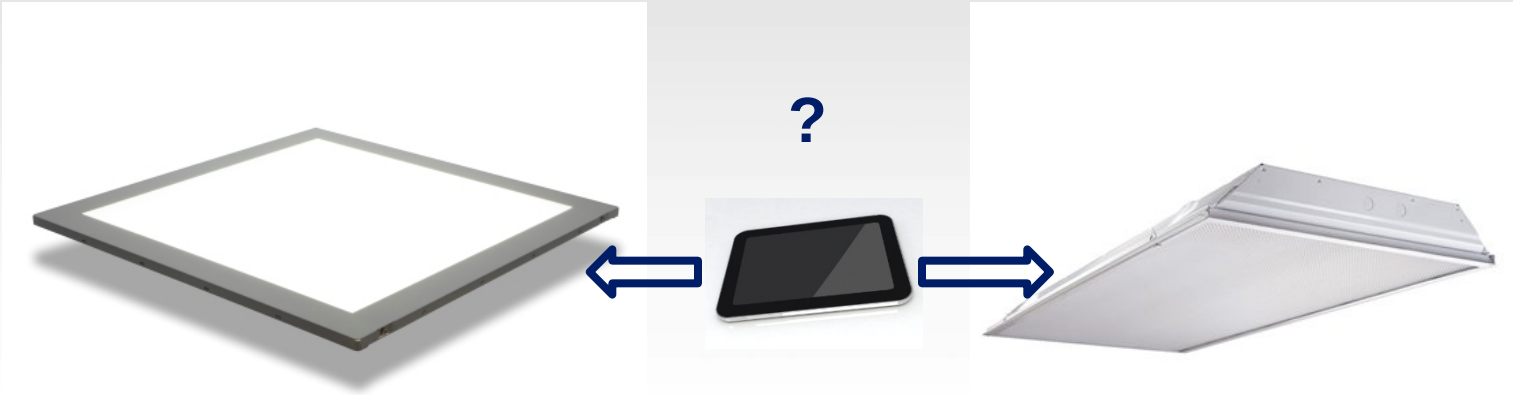


1. Non-Modular
2. Control Parameters Specific To Device

# I Already Have A Controller!

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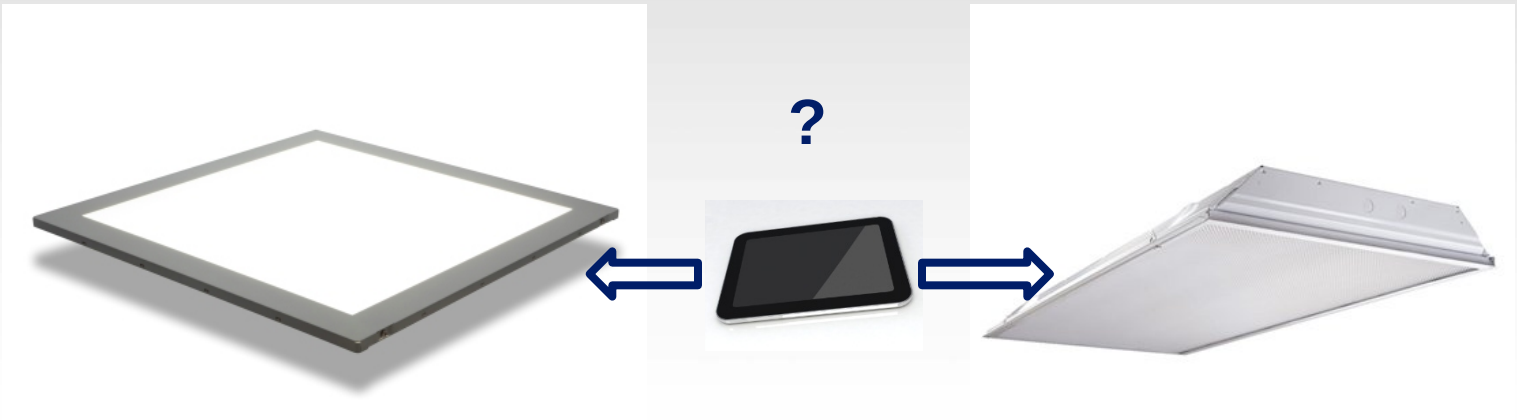
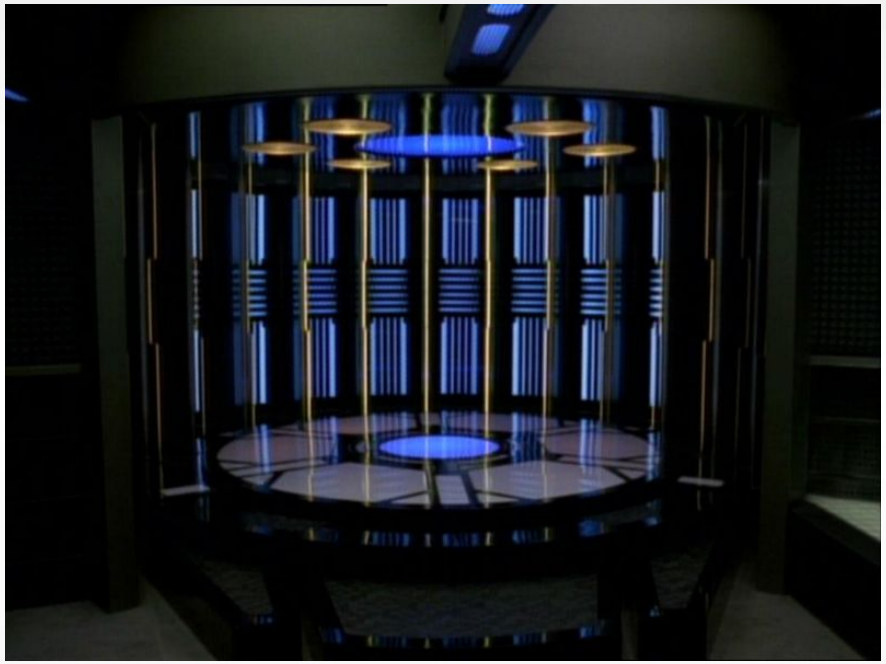



1. Non-Modular
2. Control Parameters Specific To Device
3. Intended/Expected Obsolescence

# Expected Obsolescence

## 2012 Model


## 2015 Model



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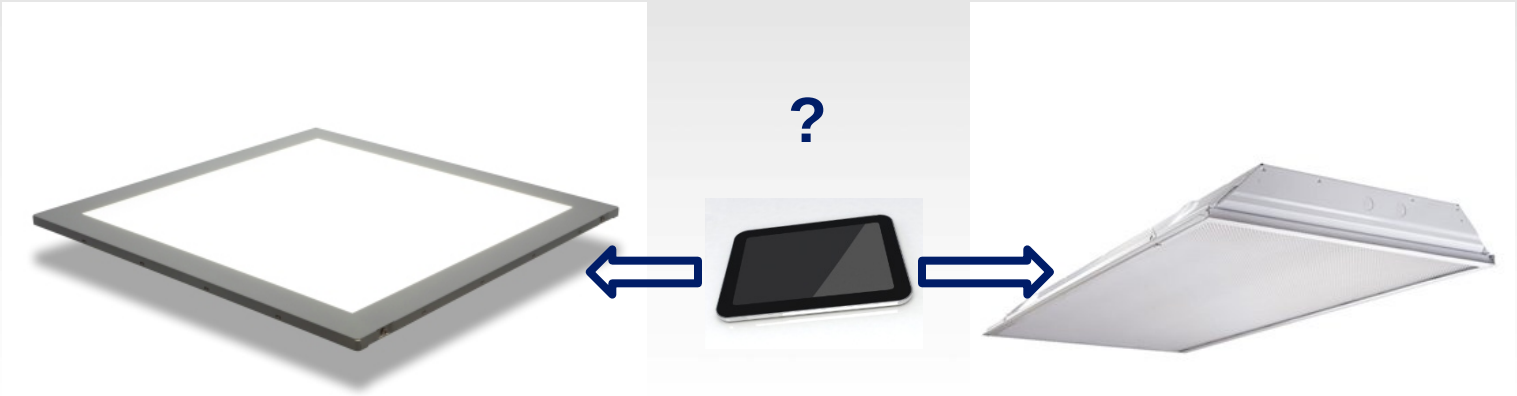
## How Is The Electronics Industry Different, And How Is It Changing Us?




1. Non-Modular
2. Control Parameters Specific To Device
3. Intended/Expected Obsolescence
4. Disruptive Influence on Sales Channel

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# Which Store Sells You the iPad, and Which Sells You The Lighting Fixture?


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## What's out there….

- Grid-layout troffers
- Pendant-style fluorescents
- Standard recessed downlighting

# The Challenge

## LED or conventional lighting?

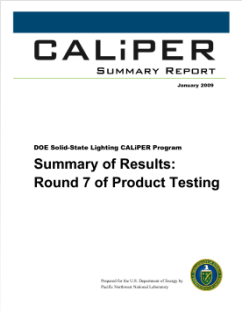
**It’s no longer about cost**

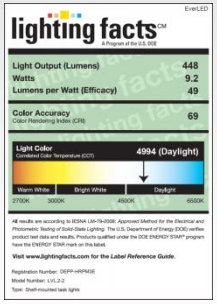
**What are the non-cost barriers to market acceptance?**




# LED implementation in the commercial ambient space

## Barriers/Challenges




1. Conflicting/confusing information
2. Unproven claims
3. Inability to interchange products
4. Fear of Obsolescence

# The Building Manager's Nightmare

Can you send me a replacement for that LED fixture you sold me last year?

Sorry, we don't carry that one anymore. It's obsolete.

# Interchangeability and Intercompatibility

**In the lighting industry, we've always taken it for granted.**

**But without it can we:**

- **Upgrade products?**
- **Source replacement parts?**
- **Interconnect different parts of a system?**
- **Merge old technology with new technology?**

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# Enter The Zhaga Consortium

Zhaga

## Zhaga makes LED light sources interchangeable


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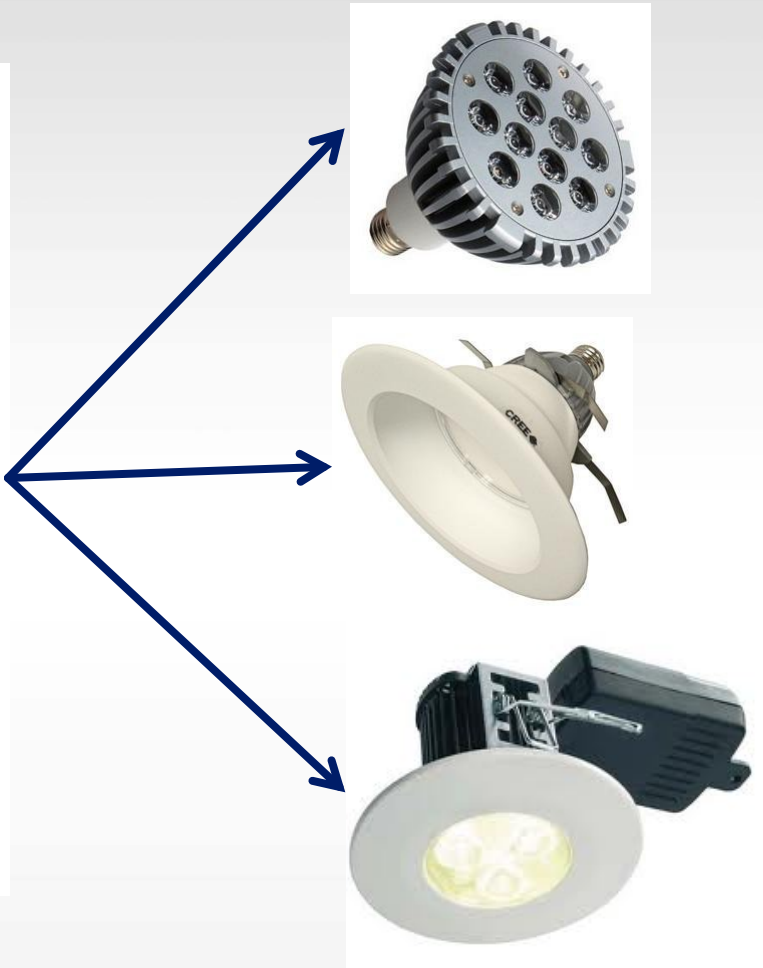
# Example 1 – Recessed Downlighting



Heat management is critical

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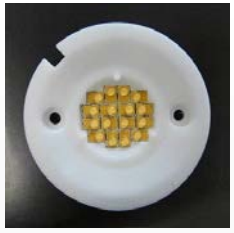
# The Zhaga Consortium

Zhaga

- **The main parameters are:**
  - **Mechanical and thermal fit with the heat sink**
  - **Size of the light emitting surface**
  - **Height of the light-emitting surface**
  - **Photometric properties of the light emitting surface**

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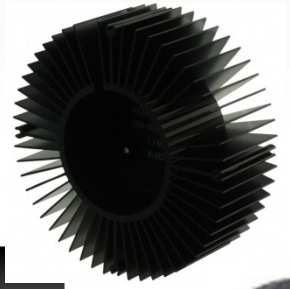
# The Zhaga Consortium

Zhaga

- **Interchangeability allows the fixture designer to create a modular system choosing components from multiple sources**



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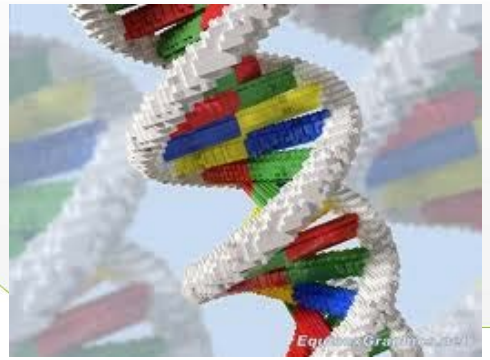
## The fact that products are made to be interchangeable does not mean that everyone will build the same thing.



# The endgame….

## For Manufacturers –

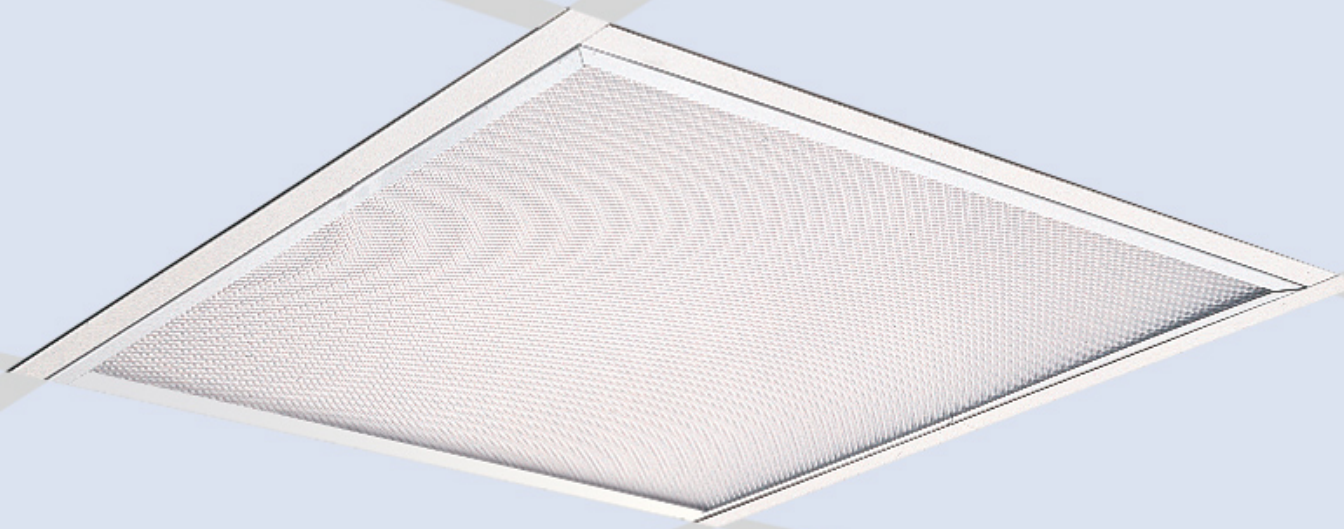
- Manufacturers can design components and subsystems to interact effectively with other Zhaga certified products to create highly effective and versatile working systems

## For End-users

- Users of Zhaga-certified products can be confident that those products will perform properly when used with other Zhaga-certified products  regardless of manufacturer

# LED Solutions for Troffers

## The market need:



Commercial building managers, architects and specifiers are looking to implement LED lighting into traditional 2FT by 4FT (600mm x 1200mm) or 2FT by 2FT (600mm x 600mm) ceiling fixtures.

# LED Solutions for Troffers

First solution: "T-LED" tubes which approximate the shape of a T8 linear fluorescent tube, but use LEDs instead –

Advantages:

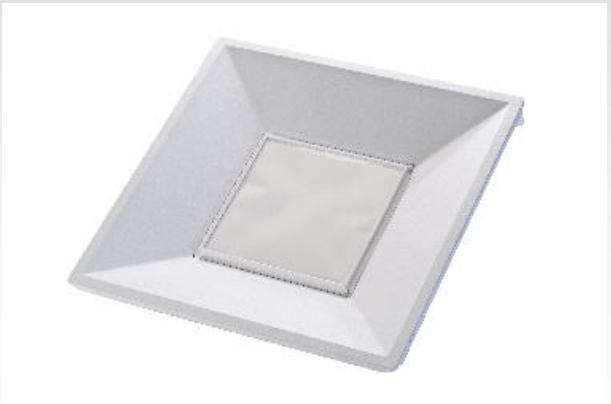
- Utilizes existing lamp bases and lamp form factors

Drawbacks:

- Possible safety issues resulting from direct branch circuit connection through fluorescent lampholders
- Insufficient light output
- "Point source" esthetic
- Limited directionality of light output
- Short lamp life due to embedded drivers
- Drivers and lamps not independently serviceable
- Not dimmable

# LED Solutions for Troffers

Second Solution:  Full panel LED fixtures



Advantages:

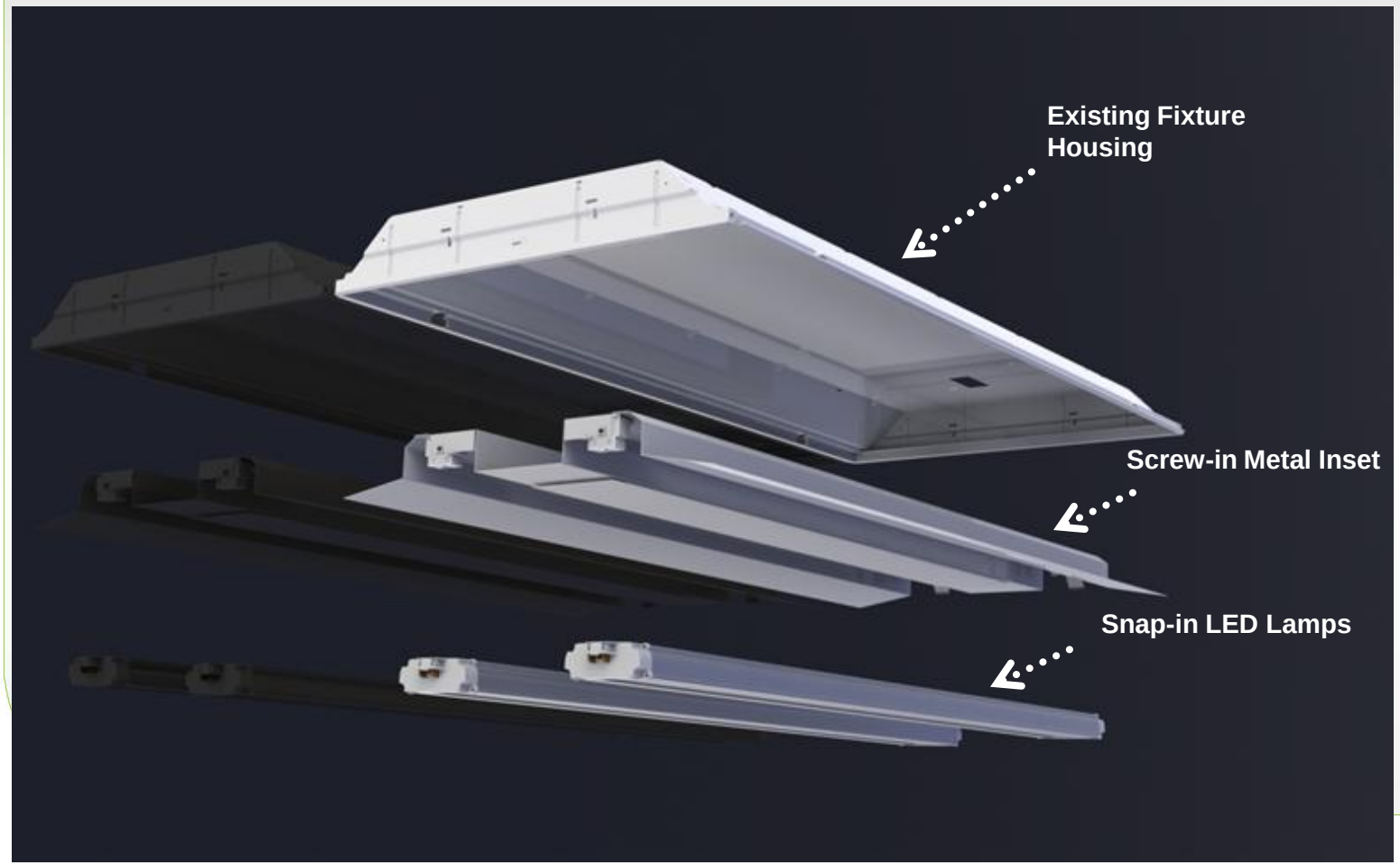
- Drop-in installation
- One-piece construction

Drawbacks:

- cannot be installed in existing fixtures
- not-upgradable
- many are not user serviceable

# LED Solutions for Troffers

## Modular Solution: Troffer Retrofit System




**Metal inset attaches with 4 screws, simple supply connection**

**Can in-corporate driver circuitry, emergency backup circuits, daylight and/or occupancy sensors, etc.**

# Troffer retrofit

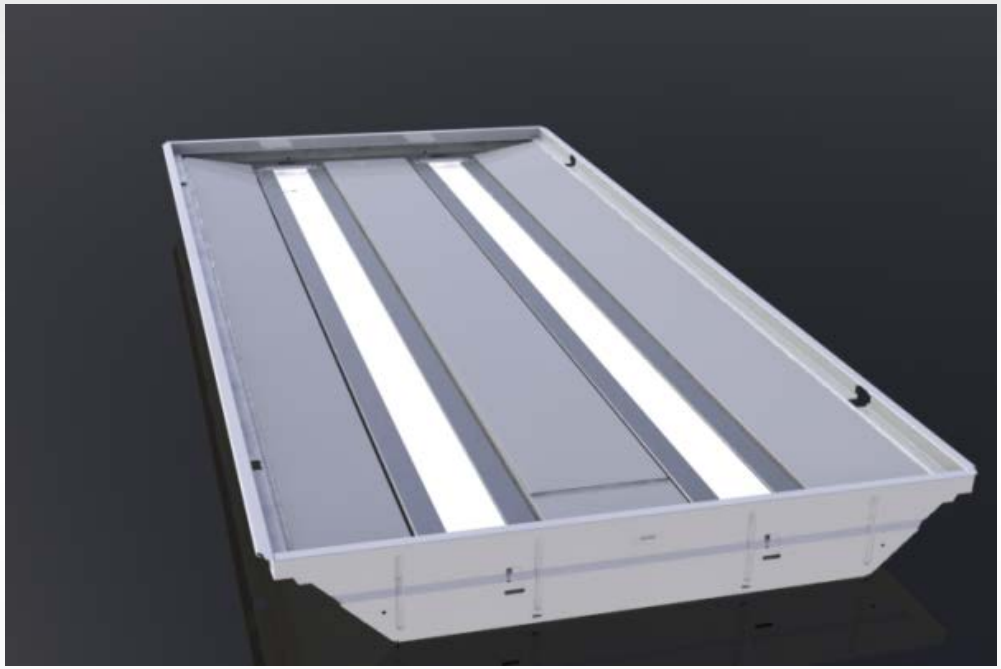
**Snap-in modular LED lamp provides higher lumen output using indirect light**

**Easily replaceable/ upgradable**

**Can be adapted to strips and/or pendants**

# Troffer retrofit system – installed view

- Installs into existing 2X2 and 2X4 fixtures.
- Extremely simple installation – pre-wired,  can be completed in minutes
- Plug-in LED lamp modules with external drivers.  Fully upgradable, simple maintenance.
- Lumen output compatible with high-efficiency fluorescent lamps
- Indirect lighting provides uniform light distribution and clean appearance.
- Dimmable
- Safe and cost effective



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# Recap

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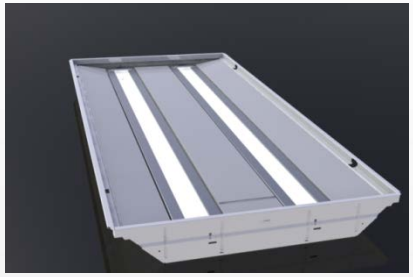

# Thank You